

*Caplus*

L13 3145 S (PEM OR (POLYMER ELECTROLYTE MEMBRANE?))  
L14 1732 S L13 AND (FUEL CELL?)  
L15 2078 S (PEFC OR (POLYMER ELECTROLYTE FUEL CELL?))  
L16 3300 S L14 OR L15

FILE 'CAPLUS, WPIDS' ENTERED AT 17:49:09 ON 30 MAY 2003  
L17 1 FILE CAPLUS  
L18 1 FILE WPIDS  
TOTAL FOR ALL FILES  
L19 2 S DE19705469/PN

FILE 'CAPLUS' ENTERED AT 17:50:08 ON 30 MAY 2003  
L20 781 S L16 AND PLATINUM?  
L21 278 S L20 AND NAFION?  
L22 0 S L21 AND TERPINEOL?

FILE 'REGISTRY' ENTERED AT 17:54:48 ON 30 MAY 2003  
E TERPINEOL/CN  
L23 1 S E3

FILE 'CAPLUS' ENTERED AT 17:55:45 ON 30 MAY 2003  
L24 5 S L21 AND ((NONPOLAR? OR (NON-POLAR?) OR (NON POLAR?) OR HYDROP  
L25 5 FOCUS L24 1-

L25 ANSWER 1 OF 5 CAPLUS COPYRIGHT 2003 ACS

AN 1999:631497 CAPLUS

DN 131:259912

TI Membrane electrode assembly for **polymer electrolyte membrane fuel cell** and method for its manufacture

IN Zuber, Ralf; Fehl, Knut; Starz, Karl-anton; Stenke, Udo

PA Degussa-Huls A.-G., Germany

SO Eur. Pat. Appl., 13 pp.

CODEN: EPXXDW

DT Patent

LA German

IC ICM H01M008-10

ICS H01M004-92

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
Section cross-reference(s): 37, 67

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 945910	A2	19990929	EP 1999-104630	19990309
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO				
	DE 19812592	A1	19991007	DE 1998-19812592	19980323
	US 6309772	B1	20011030	US 1999-274018	19990322
	JP 11329452	A2	19991130	JP 1999-77861	19990323
	BR 9900605	A	20000606	BR 1999-605	19990323
PRAI	DE 1998-19812592	A	19980323		

AB The membrane electrode assembly of the **fuel cell** comprises a **polymer electrolyte membrane** with porous reaction layers contg. catalysts and ionomers on both sides of the membrane. The reaction layer has an inhomogeneous microstructure formed from an ionomer-impregnated and embedded catalyst portion and an ionomer-free catalyst portion in wt. ratio (1-20):1, esp. (3-10):1. The catalyst can be carbon-supported Pt-group metal or alloy particles. The reaction layer has pore vol. 0.7-1.3, esp. 0.8-1.2 mL/g, for pores with diam. 0.03-1 .mu.m, and thickness 5-100, esp. 10-100 .mu.m. The ionomer can be a proton-conducting tetrafluoroethylene-fluorovinylether copolymer contg. acid groups, e.g., **Nafion**.

ST membrane electrode assembly **PEM fuel cell**;  
**polymer electrolyte membrane fuel cell**

IT Carbon black, uses

RL: CAT (Catalyst use); USES (Uses)  
(catalyst supports; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT **Platinum**-group metals

RL: CAT (Catalyst use); USES (Uses)  
(catalysts; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Glycols, uses

RL: NUU (Other use, unclassified); USES (Uses)  
(ethers, solvents; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Polyoxyalkylenes, uses

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
(fluorine- and sulfo-contg., ionomers, proton-conducting; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Polyoxyalkylenes, uses

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(fluorine-contg., sulfo-contg., ionomers, proton-conducting; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Ethers, uses  
 RL: NUU (Other use, unclassified); USES (Uses)  
 (glycol, solvents; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT **Fuel cell electrolytes**  
 (polymer membranes; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT **Fuel cells**  
 (polymer-electrolyte-membrane; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Fluoropolymers, uses  
 Fluoropolymers, uses  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (polyoxyalkylene-, sulfo-contg., ionomers, proton-conducting; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Ionomers  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (polyoxyalkylenes, fluorine- and sulfo-contg., proton-conducting; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Fluoropolymers, uses  
 Ionomers  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (proton-conducting; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT Alcohols, uses  
 Glycols, uses  
 Hydrocarbons, uses  
 Paraffin oils  
 RL: NUU (Other use, unclassified); USES (Uses)  
 (solvents; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT **Solvents**  
 (weakly polar; **nonpolar**; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT 7440-05-3, Palladium, uses 7440-06-4, **Platinum**, uses  
 7440-16-6, Rhodium, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (catalysts; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT 77950-55-1, **Nafion 115**  
 RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)  
 (membranes; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT 7439-89-6, Iron, uses 7439-98-7, Molybdenum, uses 7440-02-0, Nickel, uses 7440-18-8, Ruthenium, uses 7440-33-7, Tungsten, uses 7440-47-3, Chromium, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses 7440-62-2, Vanadium, uses  
 RL: CAT (Catalyst use); USES (Uses)  
 (**platinum** group metals alloyed with, catalysts; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT 116-14-3D, Tetrafluoroethylene, fluorovinylether copolymers,

functionalized 57578-63-9D, Perfluorovinylether-tetrafluoroethylene copolymer, functionalized

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(proton-conducting; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

IT 56-81-5, 1,2,3-Propanetriol, uses 57-55-6, 1,2-Propanediol, uses 107-41-5, Hexylene glycol 110-38-3, Decanoic acid, ethyl ester 111-82-0, Dodecanoic acid, methyl ester 463-79-6D, Carbonic acid, alkyl esters, uses 25265-71-8, Dipropylene glycol

RL: NUU (Other use, unclassified); USES (Uses)

(solvents; membrane electrode assembly for **polymer electrolyte membrane fuel cells**)

RN 7440-05-3  
RN 7440-06-4  
RN 7440-16-6  
RN 77950-55-1  
RN 7439-89-6  
RN 7439-98-7  
RN 7440-02-0  
RN 7440-18-8  
RN 7440-33-7  
RN 7440-47-3  
RN 7440-48-4  
RN 7440-50-8  
RN 7440-62-2  
RN 116-14-3D  
RN 57578-63-9D  
RN 56-81-5  
RN 57-55-6  
RN 107-41-5  
RN 110-38-3  
RN 111-82-0  
RN 463-79-6D  
RN 25265-71-8

L25 ANSWER 2 OF 5 CAPLUS COPYRIGHT 2003 ACS

AN 1994:659704 CAPLUS

DN 121:259704

TI Manufacture of solid **polymer electrolyte fuel cells**

IN Seki, Tsutomu

PA Tokyo Gas Co Ltd, Japan

SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M008-02

ICS H01M004-86; H01M004-88; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
JP 06203849	A2	19940722	JP 1992-358059	19921225

PI  
PRAI JP 1992-358059

19921225

AB The **fuel cells** are prepd. by mixing carbon black loaded Pt catalyst and a ion exchanger resin used as solid polymer electrolyte in a **solvent** to form a suspension, depositing the suspension on **hydrophobically** treated substrates to form electrode sheets, holding an ion exchanger **polymer electrolyte membrane** between an electrode sheet pair, and hot pressing.

ST solid **polymer electrolyte fuel cell**

✓? what is the solvent?

; polymer electrolyte fuel cell  
manuf

IT Fuel cells  
(manuf. of solid polymer electrolyte fuel  
cells)

IT Carbon black, uses  
RL: CAT (Catalyst use); DEV (Device component use); USES (Uses)  
(manuf. of solid polymer electrolyte fuel  
cells)

IT 7440-06-4, **Platinum**, uses  
RL: CAT (Catalyst use); DEV (Device component use); USES (Uses)  
(manuf. of solid polymer electrolyte fuel  
cells)

IT 66796-30-3, **Nafion 117**  
RL: DEV (Device component use); TEM (Technical or engineered material  
use); USES (Uses)  
(manuf. of solid polymer electrolyte fuel  
cells)

RN 7440-06-4

RN 66796-30-3

L25 ANSWER 3 OF 5 CAPLUS COPYRIGHT 2003 ACS

AN 1994:659705 CAPLUS

DN 121:259705

TI Manufacture of solid polymer electrolyte fuel  
cells

IN Seki, Tsutomu

PA Tokyo Gas Co Ltd, Japan

SO Jpn. Kokai Tokkyo Koho, 4 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M008-02

ICS H01M004-86; H01M004-88; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 06203848	A2	19940722	JP 1992-358058	19921225
PRAI	JP 1992-358058		19921225		

AB The fuel cells are prep'd. by mixing carbon black loaded Pt catalyst and a ion exchanger resin used as solid polymer electrolyte in a solvent to form a slurry, applying the slurry to a hydrophobically treated electrode substrate, removing the solvent by evapn. to form an electrode sheet, and hot pressing an ion exchanger membrane between a pair of the electrode sheets.

ST solid polymer electrolyte fuel cell  
; polymer electrolyte fuel cell  
manuf

IT Fuel cells  
(manuf. of solid polymer electrolyte fuel  
cells)

IT Carbon black, uses  
RL: CAT (Catalyst use); DEV (Device component use); USES (Uses)  
(manuf. of solid polymer electrolyte fuel  
cells)

IT 7440-06-4, **Platinum**, uses  
RL: CAT (Catalyst use); DEV (Device component use); USES (Uses)  
(manuf. of solid polymer electrolyte fuel  
cells)

IT 66796-30-3, **Nafion 117**  
RL: DEV (Device component use); TEM (Technical or engineered material  
use); USES (Uses)

(manuf. of solid **polymer electrolyte fuel cells**)

RN 7440-06-4  
RN 66796-30-3

L25 ANSWER 4 OF 5 CAPLUS COPYRIGHT 2003 ACS  
AN 1996:388536 CAPLUS  
DN 125:38070  
TI Manufacture of electrodes for solid **polymer electrolyte fuel cells**  
IN Tada, Tomoyuki  
PA Tanaka Precious Metal Ind, Japan; Watanabe Masahiro; Suttonharuto Asosheetsu Inc  
SO Jpn. Kokai Tokkyo Koho, 5 pp.  
CODEN: JKXXAF  
DT Patent  
LA Japanese  
IC ICM H01M004-88  
ICS B01J037-00; B01J037-02; H01M004-86; H01M008-02; H01M008-10  
ICA B01J023-42  
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)  
FAN.CNT 4

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 08115726	A2	19960507	JP 1994-277108	19941017
	US 5843519	A	19981201	US 1995-543632	19951016
PRAI	JP 1994-277108		19941017		
	JP 1994-332291		19941017		
	JP 1994-289288		19941028		
	JP 1994-289289		19941028		

AB The electrodes are prepd. by spray drying a dispersion of ground catalyst particles in an org. **solvent**, contg. ion exchanger resin and optionally a **hydrophobic** resin, to obtain resin coated catalyst granules and applying the granules on a substrate to form a catalyst layer. Preferably, the ground catalyst particles have diam. 0.1-10 .mu.m, the granules have diam. 1-50 .mu.m, the dispersion contains 0.5-15% solids, the spraying is carried out at 90-160.degree. and 0.8-1.5 kg/cm2 spraying pressure, and the solvent has b. .ltoreq.160.degree..

ST solid **polymer electrolyte fuel cell** electrode; fuel cell electrode catalyst resin coating; electrode catalyst ion exchanger coating; hydrophobic resin coating electrode catalyst

IT Polyoxyalkylenes, uses  
RL: NUU (Other use, unclassified); USES (Uses)  
(fluorine- and sulfo-contg., ionomers, manuf. of **Nafion** coated catalyst granules contg. **platinum** loaded on carbon support for solid **polymer electrolyte fuel cell** electrodes)

IT Electrodes  
(fuel-cell, manuf. of **Nafion** coated catalyst granules contg. **platinum** loaded on carbon support for solid **polymer electrolyte fuel cell** electrodes)

IT Fluoropolymers  
RL: NUU (Other use, unclassified); USES (Uses)  
(polyoxyalkylene-, sulfo-contg., ionomers, manuf. of **Nafion** coated catalyst granules contg. **platinum** loaded on carbon support for solid **polymer electrolyte fuel cell** electrodes)

IT Ionomers  
RL: NUU (Other use, unclassified); USES (Uses)  
(polyoxyalkylenes, fluorine- and sulfo-contg., manuf. of **Nafion** coated catalyst granules contg. **platinum** loaded on carbon support for solid **polymer electrolyte fuel cell** electrodes)

IT Drying

(spray, spray drying in manuf. of **Nafion** coated catalyst granules contg. **platinum** loaded on carbon support for solid **polymer electrolyte fuel cell** electrodes)

IT 7440-06-4, **Platinum**, uses 7440-44-0, Carbon, uses  
RL: CAT (Catalyst use); PEP (Physical, engineering or chemical process);  
PROC (Process); USES (Uses)  
(manuf. of **Nafion** coated catalyst granules contg.  
**platinum** loaded on carbon support for solid **polymer**  
**electrolyte fuel cell** electrodes)

RN 7440-06-4

RN 7440-44-0

L25 ANSWER 5 OF 5 CAPLUS COPYRIGHT 2003 ACS

AN 1999:392852 CAPLUS

DN 131:33839

TI Fuel cell electrodes and their manufacture

IN Yamada, Hiroshi

PA Tokyo Gas Co., Ltd., Japan

SO Jpn. Kokai Tokkyo Koho, 6 pp.

CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM H01M004-86

ICS H01M004-88; H01M008-10

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 11167925	A2	19990622	JP 1997-365849	19971222
PRAI	JP 1997-284428		19971001		

AB The electrodes have a catalyst layer, formed on a porous gas diffusion layer, and are prep'd. by evapg. a **solvent** from a suspension contg. catalyst particles, an electrolyte, and a **hydrophobic** agent under controlled temp. and pressure to maintain an evapn. rate of .apprx.8 cm3/min. The catalyst is preferably Pt, Pd, and/or their alloy loaded on C particles; the electrolyte is a perfluorocarbon sulfonic acid; the **hydrophobic** agent is polytetrafluoroethylene; the **solvent** is water and/or alc.; and the fuel cells are **polymer electrolyte fuel cells**.

ST fuel cell electrode catalyst layer manuf; evapn control fuel cell electrode manuf

IT Evaporation

Fuel cell electrodes

(controlled evapn. of solvents in manuf. of catalyst layers for **polymer electrolyte fuel cell** electrodes)

IT Carbon black, uses

RL: CAT (Catalyst use); USES (Uses)

(controlled evapn. of solvents in manuf. of catalyst layers for **polymer electrolyte fuel cell** electrodes)

IT Fluoropolymers, uses

RL: DEV (Device component use); USES (Uses)

(controlled evapn. of solvents in manuf. of catalyst layers for **polymer electrolyte fuel cell** electrodes)

IT 7440-06-4, **Platinum**, uses

RL: CAT (Catalyst use); USES (Uses)

(controlled evapn. of solvents in manuf. of catalyst layers for **polymer electrolyte fuel cell** electrodes)

IT 9002-84-0, Polytetrafluoroethylene 66796-30-3, Nafion 117  
RL: DEV (Device component use); USES (Uses)  
(controlled evapn. of solvents in manuf. of catalyst layers for  
**polymer electrolyte fuel cell**  
electrodes)

IT 64-17-5, Ethanol, processes 7732-18-5, Water, processes  
RL: REM (Removal or disposal); PROC (Process)  
(controlled evapn. of solvents in manuf. of catalyst layers for  
**polymer electrolyte fuel cell**  
electrodes)

RN 7440-06-4  
RN 9002-84-0  
RN 66796-30-3  
RN 64-17-5  
RN 7732-18-5

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